

WHAT IS CLAIMED IS:

1. A chemical-mechanical polishing system comprising:
 - (a) a liquid carrier,
 - (b) a polishing pad and/or an abrasive, and
 - (c) at least one amine-containing polymer with about 5 or more sequential atoms separating the nitrogen atoms of the amino functional groups.
2. The system of claim 1, wherein at least one amine-containing polymer is a condensation polymer comprising repeating units that contain an amino functional group.
3. The system of claim 2, wherein the condensation polymer is a polyaminoamide.
4. The system of claim 3, wherein the condensation polymer is a diethylenetriamine/adipic acid condensation polymer.
5. The system of claim 1, wherein at least one amine-containing polymer is polydiallyldimethylammonium chloride.
6. The system of claim 1, wherein at least one amine-containing polymer is a copolymer comprising repeating units containing an amine functional group and repeating units selected from the group consisting of amides, vinyl acetate, ethylene oxide, and propylene oxide.
7. The system of claim 1, wherein at least one amine-containing polymer has about 7 or more sequential atoms separating the nitrogen atoms of the amino functional groups.

8. The system of claim 1, wherein at least one amine-containing polymer has about 10 or more sequential atoms separating the nitrogen atoms of the amino functional groups.

9. The system of claim 1, further comprising a per-type oxidizer.

10. The system of claim 9, wherein the per-type oxidizer is selected from the group consisting of peroxides, persulfates, periodates, and permanganates.

11. The system of claim 1, further comprising a complexing agent.

12. A chemical-mechanical polishing system comprising:

- (a) a liquid carrier,
- (b) a polishing pad and/or an abrasive, and
- (c) at least one amine-containing block copolymer with at least one polymer block comprising one or more amine functional groups and at least one polymer block not comprising any amine functional groups.

13. The system of claim 12, wherein at least one amine-containing block copolymer is an AB diblock, ABA triblock, or ABC triblock copolymer.

14. The system of claim 12, wherein the polymer blocks comprising one or more amine functional groups are about 10 wt.% or more of the amine-containing block copolymer.

15. The system of claim 14, wherein the polymer blocks comprising one or more amine functional groups are about 20 wt.% or more of the amine-containing block copolymer.

20251211 011302

16. The system of claim 12, wherein the polymer block comprising one or more amine functional groups are about 40 wt.% or more of the amine-containing block copolymer.

17. The system of claim 12, wherein at least one amine-containing block has about 5 or more sequential atoms separating the nitrogen atoms of the amino functional groups.

18. A method of polishing one or more layers of a multi-layer substrate comprising:

- (i) providing a substrate comprising a first metal-containing layer and a second layer, wherein the first and second layers are not the same,
- (ii) providing a chemical-mechanical polishing system comprising:
 - (a) a liquid carrier,
 - (b) a polishing pad and/or an abrasive, and
 - (c) at least one amine-containing polymer that is (1) an amine-containing polymer with at least 5 or more sequential atoms separating the nitrogen atoms of the amino functional groups or (2) an amine-containing block copolymer with at least one polymer block comprising one or more amine functional groups and at least one polymer block not comprising any amine functional groups,
- (iii) contacting the substrate with the chemical-mechanical polishing system, and
- (iv) abrading at least a portion of the substrate to polish the substrate.

19. The method of claim 18, wherein the first metal-containing layer comprises copper, tantalum, titanium, or tungsten.

20. The method of claim 18, wherein the first metal-containing layer comprises a noble metal selected from the group consisting of platinum, iridium, rhenium, ruthenium, rhodium, palladium, silver, osmium and gold.

21. The method of claim 20, wherein the noble metal is platinum.
22. The method of claim 20, wherein the noble metal is iridium.
23. The method of claim 20, wherein the noble metal is ruthenium.
24. The method of claim 18, wherein the second layer comprises a metal oxide.

2024.04.13 10:44:50